SOV-21-58-8-15/27

Investigation of the Effect of $CaCl_2$ on Certain Physico-Chemical Processes in the System of Baked Spondilous Clay - Lime - Water

There are 2 graphs, 1 thermogram, 1 table and 2 Soviet references.

ASSOCIATION: Kiyevskiy politekhnicheskiy institut (Kiyev Polytechnic Institute)

PRESENTED: By Member of the AS UkrSSR, B.S. Lysin

SUBMITTED: March 25, 1958

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

1. Clays--Analysis 2. Lime--Application 3. Water--Application
4. Clays--Physical properties

Card 2/2

MANZHURNET, V.V.; STARCHEVSKAYA, Ye. A.

Effect of roasting temperature on the hydraulic properties of cement made from Kirovograd marls. Dop.AN URSR no.5:652-655 '61. (MIRA 14:6)

1. Kiyevskiy politekhnicheskiy institut. Predstavleno akademikom AN USSR B.S. Lysinym.

(Cement)
(Marl)

MANZHURNET, V.V.; STARCHEVSKAYA, Ye.A. [Starchevs'ka, O.O.]

Conditions for obtaining a stable form of calcium β-orthosilicate without the use of special stabilizers. Dop. AN URSR no.2:223-225 '62. (MIRA 15:2)

1. Kiyevskiy politekhnicheskiy institut. Predstavleno akademikom AN USSR B.S.Lysinym.

(Calcium silicates)

PASHKOV, I.A. [Pashkov, I.O.]; STARCHEVSKAYA, Ye.A. [Starchevs'ka, O.O.]

Activation of granulated blast furnace slags by some alkaline activators. Dop. AN URSR no.4:514-517 '64. (MIRA 17:5)

1. Kiyevskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom AN UkrSSR B.S.Lysinym.

PASHKOV, I.A. [Pashkov, I.O.]; STARCHEVSKAYA, Ye.A. [Starchevs'ka, O.O.]

Hydration of some slag minerals in the presence of alkaline activators. Dop. AN URSR no.2:239-243 '65. (MIRA 18:2)

1. Kiyevskiy inzhenerno-stroitel'nyy institut.

STARCHEVSKIY, V.I., ; MOGILYEVSKAYA, A.I.; ROTSHTEYN, A.G., redaktor; BOROVNEYEV, N.K., tekhnicheskiy redaktor.

[Labor productivity and ways of increasing in] Proizvoditel'nost' truda i puti ee povysheniia. Moskva, Gos.izd-vo lit-ry po stroit. i arkhit. 1956. 40 p. (Povyshenie proizvoditel'nosti truda v stritel'stve) (MLRA 10:4)

(Labor productivity)

STARCHEVSKIY, V.S.

USSR/Physical Chemistry - Thermodynamics, Thermochemistry, Equilibria, Physical-Chemical Analysis, Phase Transitions. B-8

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7180.

Author : P.K. Migal', V.S. Starchevskiy.
Inst : Kishinev University.
Title : Density and Surface Tension of System Methyl Alcohol - Monoethanolamine.

Orig Pub: Uch. zap. Kishinevsk. un-ta, 1957, 27, 135-140.

Abstract: The density and surface tension (δ) of the system methyl alcohol - monoethanolamine (I) were studied at 0°, 10° and 20°. A compression of the system takes place when the components are mixed, which is maximum at 33 mol. % of I; this indicates the formation of the chemical compound $2CH_3OH.H_2NCH_2CH_2OH$. The isotherms of δ also indicate the formation of the dissociating compound.

Card : 1/1

STARCHIK, L. P.

Drum-type electrostatic separator. L. P. Starchik. U.S.S.R. 105,655, May 25, 1957. The electrostatic field is generated by a polarized, solid electrolyte. M. Hosein

AUTHOR: PLAKSIN,I.N., STARCHIK,L.P., TYURNIKOVA,V.I. PA - 3093

TITLE: The Autoradiographic Method and the Investigation of the Distribution of Flotation Reagents on the Surface of Small Particles of Sulfidic Minerals. (Metodika avtoradiografii pri issledovanii raspredeleniya flotatsionnykh reagentov na poverkhnosti chastits sul'fidnykh mineralov, Russian)

PERIODICAL: Izvestiia Akad. Nauk SSSR, 1957, Vol 21, Nr 3, pp 187 - 189 (U.S.S.R.)

Received: 6 / 1957 Reviewed: 7 / 1957

ABSTRACT: The wet autoradiographic method was employed in the investigation of the distribution of flotation reagents on the granules of copper and lead sulphides in the order of flotation with different but pronounced affinitive capacities. The best results were obtained by using platelets of organic glass (a 2% solution of the same in dichlorethane) and quartz (obtained by means of the sublimation of the quartz in a 10^{-4} mm Hg vacuum inside of 4 minutes). The experiments were carried out on galena from Khapcheranga (southeast of Baikal Sea on the Mongolian border) and on pyrite from Nizhniy Tagil (central Ural). The granularity came to -74 + 43 μ. The method used for the fixing of the reagent distribution on the surface of the minerals is characterized by great precision and especially because of the use of highly sensitive emulsion and great solubility power. The wet autoradiographic method substantially accelerates

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The Autoradiographic Method and the Investigation of the Distribution of Flotation Reagents on the Surface of Small Particles of Sulfidic Minerals. PA - 3093

the analysis and delivery of the photographs since the great sensitivity reduces the time of exposure from 24 hours to 30 minutes. The method also eliminates the possibility of a chemical interaction of the surface of the mineral, the adsorbing flotation reagent and the photographic solutions. By the use of completely thin emulsion layers (of the dimension order of 1 μ) it is possible to obtain autoradiograms which correspond pretty exactly to the real distribution of the flotation reagent.
(3 illustrations and 3 citations from Slav publications)

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED: 30.10.1956
AVAILABLE: Library of Congress

Card 2/2

STARCHIK, L. P.

PLAKSIN, I.N.; ZAYTSEVA, S.P.; STARCHIK, L.P.; TRET'YAKOV, O.V.; TYURNIKOVA, V.I.; SHAFEYEV, R.Sh.

Studying the reaction of reagents and minerals in flotation by the microautoradiographic method. Zav. lab. 23 no.3:313-316 '57. (MIRA 10:6)

1. Institut gornogo dela Akademii nauk SSSR.
(Radiography) (Flotation)

Starchik, L.P.

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Microradiographic study of the action of flotation reagents. I. N. Plaksin, S. P. Zaitseva, G. A. Myasnikova, L. P. Starchik, V. I. Turnikova, G. N. Khazhinskaya, and R. S. Shafeyev (Inst. Mining Acad. Sci. U.S.S.R., Moscow). *Bull. Inst. Mining Met.* No. 611, 1–7(1957).—Microradiography has been used to study the distribution of radioactive matter on the surface of a mineral particle as well as to record natural radioactive elements in the mineral. For large mineral particles radiographic plates of the MK and MP type are used. For mineral particles of 500–150 μ with a well-defined cleavage the best results were obtained by contrast autoradiography with MK NIKFI plates (with 7–10 μ emulsion layer). For particles of the same size which do not have good cleavage, as well as smaller grains (−150 + 44 μ), the method of submerging the mineral particle into the nuclear emulsion is used. Before introducing the particles into it, the emulsion is softened by conditioning the plate over hot H_2O (~80°) for 1 or 2 min. The particles of the minerals are poured from a small height so as to form an even layer on the softened emulsion and are left to develop. "Fluid autoradiography" is used for particles of up to 75 μ in size. This method utilizes a very thin and highly sensitive 1-μ emulsion layer on the surfaces of the studied objects. The mineral particles to be tested are coated with clay on the test glass. After air drying, the surface of the grains is then covered with a protective film to eliminate chem. interaction between the particle surface and the sensitive emulsion layer. The sensitive emulsion layer is formed

reagent. To eliminate thin film and chem. interactions, the 1/2

PLAKSIN, I.N. ZAITSEVA, G.A.

collodion soln. temp. and that of the $AgNO_3$ should not be above 1°. Also, to do away with the veiling film enough H_2SO_4 to give pH 2.5 is added to the soln. of the $AgNO_3$. Grains of metallic Ag are formed in the warm soln. of $AgNO_3$ on sensitive centers in the emulsion layer which originate during the passage of β-particles. The development is conducted in a soln. of ferrous sulfate with the addn. of alc. and AcOH. Change of AcOH concn. helps to vary the size of Ag grains from 0.2 to 10 μ. When there is great activity in the prepn. it is convenient to reduce the grain size, while in the case of slight activity the study of the mineral surface is best carried out by using big grains of Ag. Radiometric and radiographic studies have also been made on flotation test products by using flotation reagents that contain radioactive isotopes. When the test was terminated the flotation products were filtered and washed in the filter to remove the reagent mechanically entrained between the mineral particles. The flotation products were then dried in air, and the av. sample of the product was subjected to radiometric measurements. The detn. of the activity of the samples was done by mica end-window counters. Comparison has been used as the basis for the study of the activity of the powders. For every set of reagent adsorption tests a standard of the same wt. and chem. content was prepd. contg. all the assigned amts. of radioactive isotope. Flotation studies over a no. of yrs. have shown that the use of added O gives pos. practical results. Radioactive isotopes introduced into the flotation reagents have shown that in a deoxidized medium the collectors are characterized by absence of collecting ability.

C. W. Schuck

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4E2C
1 Rnl
4-4E3C

3/2

STARCHIK, L.P.

20-6-21/48

AUTHORS: Klassen, V. I., and Starchik, L. P.

TITLE: On the Mechanism Underlying the Action of Reagents During Flotation (K mekhanizmu deystviya reagentov pri flotatsii).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 115, Nr 6, pp. 1129-1130 (USSR.).

ABSTRACT: Already, in the early works dealing with the flotation theory the attention had been drawn to the extremely great importance of the linear zone of the trhee-phase contact. It is exactly here that the explanation of the molecular-mechanism of the action of reagents on the adherence of the mineral grains to the air bubbles shall be sought (Rebinder). The collecting reagents mainly adhere along the three-phase boundary surface (supposition by Ostwald). Especially capable of this are those reagents whose molecules have a "triphilic" structure, i. e. groups possessing a relation with the mineral, the water and the air (accordingly). Various suppositions uttered were never experimentally proved, especially in the application of foam-flotation. In the case of the confirmation of an increased concentration in the three-phase contact-zone, however, it would be possible to determine the mechanism of the anchorage of the mineral grains in the bubbles in many respects, and to explain the causes of the molecular wetting hysteresis as well as the possibilities of a flotation

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...con with the
...three-phase contact zone
...into account in further investiga-
...the flotation theory.

On the Mechanism Underlying the Action of Reagents During Flotation. 20-6-21/48

There are 2 figures and 4 Slavic references.

ASSOCIATION: Institute for Mining AN USSR (Institut gornogo dela Akademii nauk SSSR.).

PRESENTED: By P. A. Rebinder, Academician, March 25, 1957

SUBMITTED: March 14, 1957.

AVAILABLE: Library of Congress.

Card 3/3

STARCHIK, L.P.

Device for collecting the dust produced by hole boring. Gor. zhur. no.4:58 Ap '58. (MIRA 11:4)
(Dust collectors--Patents)

SOV/24-58-11-35/42

AUTHORS: Barskiy, L. A., Plaksin, I. N. and Starchik, L. P. (Moscow)

TITLE: Study of the Distribution of Ethyl Xanthogenate and Lime on the Surface of Pyrite Particles by the Method of Quantitative Radiography (Izucheniye raspredeleniya etilovogo ksantogenata i izvesti na poverkhnosti chastits pirita metodom kolichestvennoy radiografii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 11, pp 129-130 (USSR)

ABSTRACT: The aim of the investigation was to study micro-radiographically two cases of distribution of flotation reagents on the surface of particles of sulphide minerals: 1) chemosorption coatings with a sulfhydryl reagent in the layers composed of monomolecular layers and 2) film formation during depression with lime forming multi-layer coatings. In a table on p.129 the results are given of the dependence of the adsorption of the ethyl xanthogenate, located on the pyrite, on the pH of the medium on the basis of data of quantitative contrast radiography and radiometry for pH values of

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SOV/24-58-11-35/42

Study of the Distribution of Ethyl Xanthogenate and Lime on the Surface of Pyrite Particles by the Method of Quantitative Radiography

1.9 to 11.9. The results are also graphed on p.130. There are 1 table, 1 figure and 4 references, all of which are Soviet.

SUBMITTED: January 20, 1958

Card 2/2

21.5100 SOV/180-59-5-18/37

AUTHORS: Plaksin, I.N., Smirnov, V.N., and Starchik, L.P. (Moscow)

TITLE: Preparation of Flat Polonium α-Irradiators of Great Activity

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 5, pp 122-123 (USSR)

ABSTRACT: A method was used in which polonium-210 is evaporated in vacuum (Refs 1, 2) from a copper powder serving as the carrier. Polonium in copper powder is transferred to a quartz beaker around which a nichrome spiral is wound (Fig 1). A platinum foil welded to a copper plate, which is attached to a condenser by means of a grip ring, is situated above the quartz beaker. The condenser consists of a cylindrical copper tumbler which is cooled by running water. The quartz beaker with the polonium in the copper powder, the copper rods through which current is supplied and the cooled condenser with the copper tubes through which water is circulated, are placed into a hermetically closed glass cylinder which is connected to a vacuum pipe provided with a diffusion pump. The glass cylinder may get hot due to the radiation from the spiral, and hence its walls are also

Card 1/3

Preparation of Flat Polonium α-Irradiators of Great Activity

cooled by running water. A vacuum of 10^{-4} mm Hg is set up. The pressure is controlled by means of the vacuum meter VIT-1. The system was evacuated for 30 minutes at a heater temperature of 150 to 200 °C in order to ensure de-gassing. Then the polonium was volatilized from the copper powder and deposited on the platinum foil with gradual temperature increase up to 700 to 800 °C. At this temperature polonium volatilizes from the copper powder and deposits in the form of a thin metallic layer on the cold surface of the platinum foil. The quantity of deposited polonium can be controlled by its γ-irradiation (Ref 3). The device for registration of γ-irradiation consists of the usual γ-counter which is placed in a lead box with a narrow collimating target. Before the beginning of volatilization the slit aperture of the lead box was regulated in such a manner that the γ-irradiation of polonium in the copper powder would be registered. Then the slit was moved (the geometry of count being preserved) so that the γ-irradiation of polonium, sublimated on the platinum foil, could be registered. The γ-irradiation count of the platinum

Preparation of Flat Polonium α-Irradiators of Great Activity

foil serves as a measure of the weight of polonium deposited on it. A more accurate determination of the activity of the polonium α-irradiator after its preparation was carried out from a graduated graph of the γ-count of standard quantities of polonium. The authors prepared a polonium α-irradiator with an activity of 250 μCurie by this method. The degree of uniformity in the distribution of polonium on the platinum foil can be estimated from the autoradiograph shown in Fig 2.

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There are 2 figures and 3 references, of which 2 are Soviet and 1 is English.

SUBMITTED: July 3, 1959

5(1, 2), 21(7) SOV/20-127-3-40/71

AUTHORS: Plaksin, I. N., Corresponding Member, AS USSR, Smirnov, V.N., Starchik, L. P.

TITLE: Quantitative Control of the Products Obtained in Dressing Beryllium and Fluorite Ores by α-Bombardment

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 3, pp 618-619 (USSR)

ABSTRACT: Photonuclear reaction (γ,n) had been used already earlier (Ref 1) for the quantitative determination of beryllium in ores. In connection herewith, neutrons were formed due to the effect of rigid γ-rays. The authors used the nuclear reaction (I) for controling the concentrates (as mentioned in the title) of beryllium ores; reaction (II) was used for fluorite ores. In both cases, neutrons were struck out by α-particles. Beryllium showed the largest yield of the nuclear reaction (α,n) as compared with other elements. Other elements occurring in the afore-mentioned ores in addition to beryllium and fluorite showed a considerably lower neutron yield. Thus, the number of neutrons, struck out of the above dressing products by α-particles is proportional to the beryllium and fluorite content. The polonium isotope Po-210 was used as a source of α-radiation. It has a half-life of

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Quantitative Control of the Products Obtained in Dressing Beryllium and Fluorite Ores by α-Bombardment

138.3 days and is very suitable for these purposes because only slight γ-radiation occurs in its decay. This isotope was applied to a platinum foil by vacuum sublimation. The dressing product was filled into a box for the purpose of determining the beryllium- and fluorite content. The neutrons were counted by means of an SCh-3 counter. Graduation diagrams were then plotted according to standard mixtures (Fig 1). The latter showed that the number of neutrons struck out by α-particles was in direct proportion to the beryllium content. Figure 2 shows such a diagram for the mixture fluorite - quartz - barite. Since the fluorite content of the initial ore is sufficiently high its content can also be determined in this case. The grain size of the products to be controled is irrelevant as to the neutrons struck out. The resultant neutrons are fast on the whole so that they are practically not absorbed by the layer of the product. For the same reason the material and the thickness of the box walls are irrelevant in neutron-counting. Analysis of wet products is complicated by a film formed on the particle surface by condensed water.

Quantitative Control of the Products Obtained in Dressing Beryllium and Fluorite Ores by α-Bombardment

This error, however, does not exceed .1 - 2% of the concentration to be determined. The time-consuming and sufficiently precise method mentioned above can also be applied to boron. There are 2 figures and 2 references, 1 of which is Soviet.

SUBMITTED: May 15, 1959

~~5 (2), 21 (8)~~ 5.5500 66426

AUTHORS: Plaksin, I. N., Corresponding Member AS USSR, Smirnov, V. N., Starchik, L. P. SOV/20-128-6-31/63

TITLE: The Use of Artificial Radioactivity Induced by α-Particles for the Quantitative Control of Products Containing Aluminum and Boron

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1208 - 1209 (USSR)

ABSTRACT: The radioactivity mentioned in the title has been previously (Ref 1) used for the analysis of biological tissues. The authors suggest a rapid method of analyzing powder samples for the control of working processes of ores containing aluminum and boron. Po-210 is used as an α-radiator. On irradiating boron B^{10} with α-particles, the radioactive nitrogen-isotope N^{13} is formed by a nuclear reaction (α, n). By decomposition of N^{13} ($T^1/2 = 10.1$ min), positrons are formed with a maximum energy of 1.24 Mev. Al^{27} yields, under the same conditions, radioactive phosphorus P^{30}. By decomposition of P^{30} ($T^1/2 = 2.5$ min), positrons are formed

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The Use of Artificial Radioactivity Induced by α-Particles for the Quantitative Control of Products Containing Aluminum and Boron

with a higher maximum energy of 3.6 Mev. The products containing B and Al were irradiated for 10 minutes. Within this period, the P^{30}-quantity increased up to 0.94 of the maximum value, while the activity of N^{13} simultaneously increased up to 0.5 of this value. The minimum distance of the radiation source from the product controlled (0.5 mm) reduces the losses of α-particles in the air. After this irradiation, the products were checked with the help of an end-window counter. The time interval between the activation irradiation and the beginning of counting must be a minimum and constant. The radioactivity induced is recorded by a unit of type B-2. For determining the boron- and aluminum contents, calibration diagrams are drawn on the basis of standard mixtures with a known Al- and B-content. Figure 1 shows such a diagram for hydroboracite ($CaO \cdot MgO \cdot 3B_2O_3 \cdot 6H_2O$). By irradiation of Mg^{25}, a radioactive isotope Al^{28} is formed by the nuclear reaction (α,p); this isotope radiates electrons with a maximum energy of 3.0 Mev and a half life of 2.3 minutes. In

counting the positron-electron radioactivity induced in the hydroboracite, the total radiation of N^{13} and Al^{28} is recorded. The activity of Al^{28} is considerably smaller than that of N^{13} since the Mg-quantity in the hydroboracite is small, and the yield of the nuclear reaction (α,p) is also small. The radiation of Al^{28} does not distort the proportionality between the value of the induced activity and the hydroboracite content in the product controlled since Mg is a component of the hydroboracite lattice. The calibration diagram (Fig 2) shows that the method described makes it possible to determine the aluminum oxide in the range of 1 - 100%. Other radioactive elements resulting from the nuclear reactions either have a long, or a very short, half life, and give no noticeable activity in the B- and Al-analysis. If the thickness of layer of the product controlled exceeds 20 μ, its amount of weight is unimportant to the amount of induced radioactivity. Thus, also small quantities of 1 g and less may

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The Use of Artificial Radioactivity Induced by α-Particles for the Quantitative Control of Products Containing Aluminum and Boron SOV/20-128-6-31/63

be used for the analysis. The method suggested facilitates a rapid determination and a technologically acceptable accuracy of determination of boron and aluminum in abundant ores, products of dressing, and alloys. Ye. G. Prozhoga cooperated in the paper. There are 2 figures and 1 reference.

SUBMITTED: July 3, 1959

4

Card 4/4

STARCHIK, L. P.

LATYSHEV, G. D.

PHASE I BOOK EXPLOITATION SOV/5410

Tashkentskaya konferentsiya po mirnomu ispol'zovaniyu atomnoy energii, Tashkent, 1959.

Trudy (Transactions of the Tashkent Conference on the Peaceful Uses of Atomic Energy) v. 2. Tashkent, Izd-vo AN UzSSR, 1960. 449 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk Uzbekskoy SSR.

Responsible Ed.: S. V. Starodubtsev, Academician, Academy of Sciences Uzbek SSR. Editorial Board: A. A. Abdullayev, Candidate of Physics and Mathematics; D. N. Abdurasulov, Doctor of Medical Sciences; U. A. Arifov, Academician, Academy of Sciences Uzbek SSR; A. A. Borodulina, Candidate of Biological Sciences; V. N. Ivashev; G. S. Ikramova; A. Ye. Kiv; Ye. N. Lebanov, Candidate of Physics and Mathematics; A. I. Nikolayev, Candidate of Medical Sciences; D. Nishanov, Candidate of Chemical Sciences; A. S. Sadykov, Corresponding Member, Academy of Sciences USSR, Academician, Academy of Sciences Uzbek SSR; Yu. N. Talanin,

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Transactions of the Tashkent (Cont.) SOV/5410

Candidate of Physics and Mathematics; Ya. Kh. Turakulov, Doctor of Biological Sciences. Ed.: R. I. Khamidov; Tech. Ed.: A. G. Babakhanova.

PURPOSE : The publication is intended for scientific workers and specialists employed in enterprises where radioactive isotopes and nuclear radiation are used for research in chemical, geological, and technological fields.

COVERAGE: This collection of 133 articles represents the second volume of the Transactions of the Tashkent Conference on the Peaceful Uses of Atomic Energy. The individual articles deal with a wide range of problems in the field of nuclear radiation, including: production and chemical analysis of radioactive isotopes; investigation of the kinetics of chemical reactions by means of isotopes; application of spectral analysis for the manufacturing of radioactive preparations; radioactive methods for determining the content of elements in the rocks; and an analysis of methods for obtaining pure substances. Certain

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instruments used, such as automatic regulators, flowmeters, level gauges, and high-sensitivity gamma-relays, are described. No personalities are mentioned. References follow individual articles.

TABLE OF CONTENTS:

S/180/60/000/02/018/028
E111/E152

AUTHORS: Zaytseva, S.P., Myasnikova, G.A., Plaksin, I.N., Starchik, L.P., Tyurnikova, V.I., Khazhinskaya, G.N., and Shafeyev, R.Sh. (Moscow)

TITLE: Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, Nr 2, pp 120-132 (USSR)

ABSTRACT: This paper, which includes a survey, was presented by Plaksin at the general meeting of the Otdeleniye tekhnicheskikh nauk (Technical Sciences Division) AN SSSR (Academy of Sciences, USSR) on 27th October 1959. It points out that radioactive methods are particularly suitable for flotation research, where they have been applied by various Soviet research organisations including the Institut gornogo dela (Mining Practice Institute) AN SSSR (Acad.Sci. USSR) (Refs 1 and 2). The methods developed there are: contact microradiography, in which pulp particles are fixed on a cover glass which is then placed on photographic film; trace microradiography, in which the particles are immersed directly in

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Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

photographic emulsion; "wet" microradiography, based on the physical adsorption and maturing of silver crystals on active centres in emulsion in a silver-ion containing solution (developed by Gomberg for biological and metallographic use). Experiments with S^{35}-containing mercapto reagents showed that under normal conditions there was no direct and unique relation between the average density of the collecting-agent layer on the mineral and its flotability (Fig 1). Automicroradiography gave the first experimental proof of the unevenness of the coverage of particle by collecting agent (Fig 2); this work was supplemented by measurements of the electric properties of sulphide-mineral surfaces. The donor and acceptor regions were revealed (Fig 3) by polarization in a solution of $CuSO_4$ (or $AgNO_3$) and of KI (or $K_3[Fe(CN)_6]$), respectively. Microautoradiographic studies showed that reagent-distribution is uneven from particle to particle: only those particles which are slightly or not covered with reagent do not appear in the

Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

froth product (Fig 4). Using the microradiographic method the nonuniformity of various flotation-reagent absorptions by various minerals has been studied (Refs 10-14). With the aid of a special apparatus designed at the Institute by S.V. Bessonov (Ref 16), the influence of oxygen-content on flotation was investigated: some oxygen was found to be essential for flotation, the uniformity of reagent distribution on the froth-product particle surface rising with increasing oxygen concentration. The attachment of ethyl xanthate on some minerals, denied by some non-Soviet workers, was demonstrated using radioactive isotopes (Refs 23, 37 and 40). Investigation of these minerals (zinc blende and pyrrhotine) enabled the influence of their crystal-lattice defects on flotation to be shown. Fig 5a shows the effect of grams of pine oil per ton of mineral on recovery of pyrrhotine, and Fig 5b shows the corresponding effect on the absorption of various xanthates on the mineral. Fig 6 gives corresponding curves for addition of type DS

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Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

detergent (mainly consisting of alkylaryl sulphonates): as the detergent feed rises more and more pyrrhotine grains have nonuniform xanthate distribution (Figs 7a and 7b give microradiographs for froth product particles for 200 and 1800 g of detergent per ton, respectively). Work with marked xanthate has shown that chromates do not displace that reagent from sulphide-mineral surfaces (Refs 26, 27) and, using Cr^{51} the depressing action of chromate has been studied in relation to the amount added and the pH of the solution. Fig 8 shows dichromate adsorption by galenite as a function of pH; in Fig 9 the adsorption of chromate (A) and the recovery of froth fractions of galenite (curves 1, 4) and pyrite are shown as functions of potassium dichromate added (g/ton). Under acid conditions the Freundlich isotherm is followed in Fig 8; an alkaline solution adsorption stays virtually constant. In Fig 9 maximum adsorption for both minerals corresponds to minimum flotation recovery and conversely. The authors conclude that the depressive

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E111/E152

Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

action of chromates on these minerals is due to the formation on the mineral surface of very insoluble medium or basic chromates which prevent adhesion of particles to bubbles. Marked tridecylamine has been used to investigate the reaction of a cationic collecting agent with minerals. Fig 10 shows the adsorption of the reagent from aqueous solution of its acetates on huebnerite, quartz, fluorite and calcite (curves 1, 2, 3 and 4, respectively). Recoveries of huebnerite and quartzite were compared with tridecylamine absorption by them for pH of 1.5-10.0. Flotation experiments were also carried out with mixtures of minerals using marked tridecylamine (100 g/ton) at pH = 1.5. Complete separation into two products was possible, with 41-67% of the reagent absorbed by the froth product and only 1-4% by the non-froth. Experiments were made on the firmness of adhesion of cationic collecting agents on non-sulphide mineral surfaces in which 1-150 ml volumes of distilled water were used to wash tridecylamine from mineral powders:

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Use of Radioactive Isotopes and Nuclear Radiations in the Investigation of the Flotation Process

adhesion was strong on huebnerite and wolframite and less so on quartz, calcite and fluorite (Fig 11 gives absorption as functions of water volume). Microradiograms (Fig 12) show that tridecylamine is unevenly distributed on the huebnerite-particle surface. The authors give some examples of radioactive isotope applications. Plaksin and M.A. Goldin have proposed a pulp-density test device based on radioactive caesium. A special launder proposed by the authors has given good results in prolonged tests at the Yuzhnyy gornoobogatitel' nyy kombinat (Southern Mining Beneficiation Combine). Quantitative analysis of ore dressing products could be obtained by bombardment with alpha particles to cause neutron emission. This has been applied to fluorite ores, with a special installation for bombardment (from Po^{210} on platinum foil) in which the powder enclosed in a container was placed on a table on a type SCh-3 neutron counter with the source above it. Working curves for the test elements are previously prepared. Particle size has

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no appreciable effect and the fast neutrons emitted are not absorbed in the material. This procedure is simpler and safer than previously proposed (Refs 32, 33) methods. For aluminium-containing ores the authors propose the transmutation of Al^{27} into P^{30} by alpha particles from Po^{210}, the decay of the phosphorus giving high-energy positrons. This method, with suitable working curves, enables 0-100% Al_2O_3 to be determined sufficiently accurately without interference from other elements, and requires a sample of 1 g or less. There are 12 figures and 42 references, of which 30 are Soviet, 11 English and 1 is German.

Card 7/7

SUBMITTED: December 4, 1959

STARCHIK, L.P.

Charges originating on mineral particles during separation in an electrostatic field. Nauch.soob.Inst.gor.dela 6:113-116 '60. (MIRA 15:1)

(Ore dressing)

S/089/60/009/005/001/020
B006/B070

AUTHORS: Plaksin, I. N., Smirnov, V. N., Starchik, L. P.

TITLE: Application of the Reaction (α,n) for a Quantitative Determination of the Contents of Beryllium, Boron, and Fluorine in Dressing Products

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 5, pp. 361 - 365

TEXT: As a permanent control of concentration during dressing processes is necessary, and since the existing chemical and spectroscopic methods of analysis are slow and complicated, an express method is suggested for the quantitative control of the beryllium, boron, and fluorine contents of ores and dressing products. This method is based on the application of an (α,n) reaction. The alpha source was Po^{210} ($T_{1/2}$=138.3 days, E_α=5.3 Mev, maximum range of the alpha particles in air = 3.8 cm, source intensity = 250 microcuries) applied onto a platinum foil and placed in a simple appliance (Fig.1) and arranged to be over the substance to be

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investigated. This substance is placed in a casket on a small table. Under the table-top is placed a neutron counter. For the determination of beryllium, use is made of the reaction $Be^9 + He^4 \rightarrow C^{12} + n^1$ which has the highest yield, i.e., 80 neutrons for 10^6 alpha particles of the source. For the determination of fluorine, the reaction used is $F^{19} + He^4 \rightarrow Na^{22} + n^1$ giving a yield of 12 neutrons for 10^6 alpha particles. Boron control utilizes the reactions $B^{10} + He^4 \rightarrow N^{13} + n^1$ and $B^{11} + He^4 \rightarrow N^{14} + n^1$ with a yield of 24 neutrons per 10^6 alphas. The yield from (α,n) reactions on other elements is relatively poor (Al: 0.74 n, Si: 0.16 n, C: 0.11 n, O: 0.07 n). Calibration tests showed that the number of neutrons emitted is directly proportional to the boron, beryllium, and fluorine contents. Fig.2 shows the calibration curve (neutron pulses per minute versus BeO concentration) for a mixture of BeO, quartz, and feldspar. Fig.3 shows the calibration curve for a mixture of CaF_2, quartz, and baryta; and Fig.4 shows that for

Application of the Reaction (α,n) for a Quantitative Determination of the Contents of Beryllium, Boron, and Fluorine in Dressing Products

S/089/60/009/005/001/020
B006/B070

B_2O_3 + hydrobaryta + gypsum. The recorded neutrons are assigned to the individual reactions according to the relative yields compared with standard samples. For a counting time of 15 minutes, the experimental error is 1.5 - 2%. On account of its simplicity, the method is suitable also for investigations in the open air. There are 5 figures and 15 references: 11 Soviet and 2 US.

SUBMITTED: January 21, 1960

Card 3/3

68811

21.7100

AUTHORS: Plaksin, I. N., Corresponding Member of the AS USSR, Starchik, L. P.

S/020/60/131/01/023/060
B013/B007

TITLE: The Separation of Minerals in a Current of Ions Produced by an α-Radiation

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 1, pp 85 - 86 (USSR)

ABSTRACT: The present paper deals with the separation mentioned in the title and with the apparatus required in this connection. For the separation of minerals according to their electrical properties corona separators and corona-electrostatic separators are mainly used. The mineral parts to be separated fall from a bunker on to the surface of a revolving earthed drum, and the corona-forming electrode is located at a distance of several centimeters from this drum. The mineral particles get their charge from the ion current originating from the corona-forming electrode after which they are deposited on the surface of the drum. There they are conveyed to a gap, where they are deposited in the corresponding container. In a dependent discharge, a stronger current is obtained, and that at a lower voltage than in a corona discharge. In this case the discharge amperage will

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The Separation of Minerals in a Current of Ions Produced by an α-Radiation

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B013/B007

depend not only on the field strength but also on the intensity of the ionizer. A β- and γ-radiation in the case of high penetrability has a lower ionizability than α-radiation. One α-particle produces more than 100,000 ion pairs on its path in air. It is therefore interesting to investigate the possibility of applying α-radiation for the charging of mineral particles in an electric separator. Po-210 served as source of α-radiation. The corresponding electric separator has an α-ionizer mounted to a corresponding holder instead of the corona-forming electrode; this ionizer is located at a distance of 4.2 cm from the surface of the earthed drum. Figure 1 shows the scheme of this electric separator. Figure 2 shows the dependence of the amperage of the ion current produced by the α-ionizer in an electric separator on the voltage between the drum and platinum electrode. With such a high activity of the α-emitter, the saturation current cannot be attained. In this α-ionization electric separator collective ilmenite-garnet concentrates were separated (ilmenite 52.3% and garnet 47.7%). The dependence of the ilmenite content found in a current of negative ions during separation is shown in figure 3. The ilmenite content in container I (for conductive

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particles) grows with the discharge amperage, and the yield in container II (for the intermediate product) decreases. The ilmenite, which is of high conductivity, transfers its charge to the drum and falls into container I. In container III (for particles with low conductivity) there is always a very small quantity of ilmenite which is mechanically conveyed by garnet particles. In strong discharge currents an efficacious separation of the mineral mixtures is probably attained. For this purpose α-ionizers of high activity must be used. An intense α-ionization may also be used in other devices in which a corona discharge is used for charging mineral particles (e.g. in corona-chamber-separators). There are 3 figures.

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR (Institute of Mining of the Academy of Sciences of the USSR)

SUBMITTED: December 3, 1959

S/137/62/000/001/018/237
A060/A101

AUTHORS: Plaksin, I. N., Smirnov, V. N., Starchik, L. P.

TITLE: Application of α-radiation to the automation of the material composition control of the concentration products of certain ores

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 1, 1962, 7-8, abstract 1057 (V sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR. V. 4". Moscow, Gostoptekhizdat, 1961, 270 - 276)

TEXT: The authors consider two methods of analyzing ores by means of α-radiation from Po^{210}: neutron radiation analysis and activation analysis. A plane emitter with activity of 250 μ curies, whose fabrication is described, was used in this study as the radiation source. The method of controlling beryllium, fluorite, and hydroboracite ores is described. Calibration graphs are presented. The second method used artificial radioactivity induced by α-particles where an α-emitter from Po^{210} with activity 120 μ curie was used. It is possible to automate the control of Be, F, B, on the basis of the principle of continuous feed of the material tested. The layer of the latter should be evened out upon the belt by a knife. After being amplified the electrical

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Application of α-radiation ...

impulses are fed to an integrator and an automatic recorder. As the belt moves further, the product is brought under an end counter, shielded with lead.

I. Margolin

[Abstracter's note: Complete translation]

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PLAKSIN, I.N.; STARCHIK, L.P.

Using polonium 210 for separating minerals in a flow of ions caused by alpha rays. Izv. vys. ucheb. zav.; gor. zhur. no.11:162-166 '61. (MIRA 15:1)

1. Institut gornogo dela AN SSSR. 2. Chlen-korrespondent AN SSSR (for Plaksin).
(Separators (Machines)) (Alpha rays--Industrial applications)
(Minerals--Electric properties)

S/089/61/011/006/012/014
B102/B138

AUTHORS: Plaksin, I. N., Belyakov, M. A., Starchik, L. P.

TITLE: Po^{210}-α-indiced radioluminescence for analysis of ores and minerals

PERIODICAL: Atomnaya energiya, v. 11, no. 6, 1961, 548 - 549

TEXT: As the usual analyzers based on radio- or cathode-luminescence, as designed as the "Mekhanobor" Institute for instance, are too heavy for field conditions and depend on power supply, a new device has been designed. Pure Po^{210}-α-radiation (E = 5.3 Mev, range in air 3.8 cm) was used for luminescence activation. The device is shown in Fig. 1. Powdered or ground ore samples are placed on a plate at the bottom of the vessel and luminescence is observed with the naked eye or through a lens. The α-source used had an activity of 1.8 curies. The minerals are identified according to color, brightness, and afterglow:

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Mineral	Color	Brightness	Afterglow
calcite	red	high	weak
dolomite	dull red	very high	weak
fluorite	bluish violet	very high	strong
scheelite	violet	weak	very weak
beryl	light blue	weak	very weak

Intensive radioluminescence is also observed when diamonds undergo α irradiation and for this reason it is used, instead of gamma, for grading Yakutsk diamonds. For quantitative analyses a photocell was used. The photocell, a multiplier of the type ФЭУ-1 (FEU-1), was fed via a "Kaktus" radiometer. This experimental setup was tested when determining scheelite with a 70-μcurie Po^{210} source. It was then used to compare the luminescence intensities of scheelite induced by β and αr-radiation from emitters of equal activity. αr-radiation was found to be about four times more effective for luminescence activation. There are 3 figures, 2 tables, and 5 Soviet references.

S/020/61/136/005/031/032
B103/B208

AUTHORS: Plaksin, I. N., Corresponding Member AS USSR, Belyakov, M. A., and Starchik, L. P.

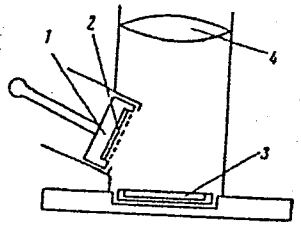
TITLE: Application of radioluminescence caused by α-particles of polonium-210 for the analysis of ores and minerals

PERIODICAL: Doklady Akademii nauk SSSR, v. 136, no. 5, 1961, 1165-1167

TEXT: The authors suggest the application of radioluminescence in the analysis of ores and minerals, which offers certain advantages. It may replace successfully the cathode luminescence already applied to a large extent (Ref. 2). This latter method requires vacuum and high-frequency. Although the apparatus devised at the "Mekhanobr" Institute (Ref. 3) is a suitable construction, it cannot always expediently be operated owing to its high weight and the necessity of current supply. In the radioluminescence method, however, only a radioactive isotope is required, in this case polonium-210 which serves as α-radiation source. This offers the following advantages: 1) α-radiation gives a much more intense luminescence than the β- or γ-radiation of equal activity; 2) α-radiation

Application of radioluminescence ...

is not accompanied by any other radiation (except one γ-quantum per 10^5 α-particles); 3) for this reason the application of this radiation source is rather simple; 4) the penetrating power of α-radiation is low, which simplifies the required apparatus in spite of the high activity of Po-210 (1.8 curie was applied). Fig. 1 shows such a device.



5) The α-source may be used to determine elements on the basis of nuclear reactions (Refs. 4,5). 6) The luminescence of minerals is observed either by the naked eye or (in the case of finely divided substances)

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by means of a strong lens (4). The following safety measures are necessary: the Po-210 sources contaminate the surrounding objects by aggregate recoil. To counteract this, the Po-210 layer is screened by a protective film or a thin foil, which does not absorb α-radiation, or such a film may be also mounted on the surface of the α-source. The resultant energy losses reduce the production of luminescence, but may be compensated by increased activity of the α-source. The samples in the form of powders or lumps (up to a size of 20 mm) are irradiated on the plate of the mentioned device (3) by the α-source (2) in a holder (1). The method of analysis resembles that described in Ref. 3. The authors studied the luminescence of the following minerals: calcite, dolomite, scheelite, fluorite, and beryl. The diamonds of Yakutiya show a luminescence visible even at daylight. The luminescence of Tl-204 as β-radiation source (activity 70 millicuries) which was studied for comparison purposes, appeared only slightly in scheelite and in diamonds, while that caused by the α-source of equal activity was visible even at daylight. There are 1 figure, 2 tables, and 5 Soviet-bloc references.

S/020/61/136/005/031/032
B103/B208

Application of radioluminescence ...

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR
(Mining Institute. Academy of Sciences, USSR)

SUBMITTED: November 15, 1960

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S/020/61/137/004/023/031
B103/B208

AUTHORS: Plaksin, I.N., Corresponding Member AS USSR,
Slepchenko, I.F. and Starchik, L.P.

TITLE: Application of neutron-activation analysis for determining the tungsten content in minerals and dressing products

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 4, 1961, 880 - 881

TEXT: The authors used artificial radioactivity caused by neutrons for determining the tungsten content in minerals and dressing products by activation analysis. The difficulty encountered in the chemical separation of accompanying elements may be overcome by determining the principal component by this method. As tungsten has a (n, γ) cross section of 9.9 barns per atom, the radioactive isotope W^{187} ($T_{1/2}$ 24.1 hr) is obtained by artificial radioactivity. This permits tungsten determination by neutron-activation analysis. In the dressing products of tungsten during processing of scheelite ores, the scheelite quantity in the concentrate reaches several dozen per cent. Other elements accompanying tungsten in

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these ores, such as silicon, tin, calcium, iron, sulfur, magnesium, and nickel have a small (n, γ) cross section or appear in quantities which do not interfere with the tungsten determination. These are copper, arsenic, manganese, sodium, and phosphorus. The irradiation with neutrons was performed by a polonium-beryllium source with an activity of 8 curies referred to polonium. This source was placed in the center of a paraffin lump for neutron moderation. Boron-containing paraffin bricks and cadmium sheet protected against the neutrons. Lead was used for protection against the comparatively weak γ-radiation of the paraffin lump. A container with scheelite-containing dressing products was placed in the middle of the paraffin lump in which a channel was made. The induced activity was counted by an end-window counter in the B-2 (B-2) apparatus on the basis of the β-radiation of the isotope W^{187}. The time of activation was 15 hr, and was sufficient to produce the desired activity of the specimen. The activity of the test specimen was increased by the accompanying elements during this time. In order to reduce the activity of the light elements (aluminum, silicon) in the specimen, 20 min were allowed to pass prior to counting. The authors found that the activity of magnesium, molybdenum, and copper

may be eliminated by using absorption filters for β-radiation of low energy (1.33 mev at W^{187}), and counting the activity twice. Fig. 1 presents a calibration diagram of the determination of scheelite mixed with fluorite. The radioactivity count is plotted as a function of the tungsten content. Its linearity permits the determination of scheelite in dressing products. The accuracy of determination may be increased by prolonging the time of counting of the induced radioactivity, as $T_{1/2}$ of W^{187} is comparatively high (24.1 hr). When counting for 30 min, the determination error of scheelite in the concentrate is 1.5%. The tungsten content in manganese-containing minerals (hübnerite) which have a large cross-section on thermal neutron capture may be determined from the γ-radiation by nuclear spectroscopy. Iron in ferberite has an (n, γ) cross-section of 0.001 barn per atom and thus can not be activated by a source of β curies (polonium). The molybdenum content in concentrates of molybdenum-scheelite ores is 4.5%. The $T_{1/2}$ of Mo^{101} being 14 min, the increase of the radioactivity count of the specimen as a result of molybdenum activation may be prevented by allowing to pass 1.5 - 2 hr before counting. Finally, the authors state

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that neutron-activation analysis may be used for determining tungsten in steel, in cermets, and also in cobalt- and titanium-containing hard metals, as the induced activity of cobalt and titanium may be reduced by waiting for 1.5 hr prior to counting. There are 1 figure and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR
(Mining Institute of the Academy of Sciences USSR)

SUBMITTED: November 17, 1960

Card 4/5

PLAKSIN, I.N.; BELYAKOV, M.A.; RENTYRGIN, V.L.; STARCHIK, L.P.

Use of nuclear reaction (α,n) for the determination of certain elements in solutions. Dokl. AN SSSR 139 no.2:424-426 Jl '61. (MIRA 14:7)

1. Chlen-korrespondent AN SSSR (for Plaksin).
(Nuclear reactions) (Chemistry, Analytical)

S/020/61/141/004/015/019
B101/B110

AUTHORS: Plaksin, I. N., Corresponding Member AS USSR, Belyakov, M. A., and Starchik, L. P.

TITLE: Application of gamma quanta produced by interaction of α-particles with nuclei of fluorine and boron for determining these elements in concentration products

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 4, 1961, 921 - 924

TEXT: In previous papers (DAN, 127, no. 3, 618 (1959); Atomnaya energiya, 9, no. 5, 361 (1960)) the authors applied the (α,n) reaction for determining F and B in concentration products (flotation concentrates). Be, B, and Li, however, were interfering with the determination of F. B was also determinable by induced radioactivity (DAN, 128, no. 6, 1208 (1959)). The application of nuclear gamma ray spectroscopy facilitates the determination of B and F in the presence of other elements having a high gamma quantum yield on the basis of the (α,n) reaction. The following data from publications are cited: In the nonelastic scattering of α-particles on F^{19} nuclei, 0.09 and 0.22-Mev gamma quanta are produced. Ne^{22} produced by the reaction $F^{19}(\alpha,p)Ne^{22}$

Application of gamma quanta...

emits 1.24 and 1.50-Mev gamma quanta. The reaction $F^{19}(\alpha,n)Na^{22}$ results in Na^{22} emitting 0.62-Mev gamma quanta. The gamma ray spectrum arising from the interaction of α-particles with boron nuclei contains 2.3 and 3.8-Mev gamma quanta. The former are a product of the reactions $B^{10}(\alpha,n)N^{13}$ and $B^{11}(\alpha,n)N^{14}$, while 3.8-Mev gamma quanta result from the reaction: $B^{10}(\alpha,p)C^{13}$. The advantage of gamma ray spectroscopy is that the accuracy of recording of the gamma quanta is by one order of magnitude higher than that of recording of the neutrons. For this reason, α-emitters of low activity may be used. While for determining B and F on the basis of the (α,n) reaction an α-source of 250 mc was required, gamma ray spectroscopy could be performed using a Po^{210} α-source with an activity of only 5 mc. The α-source is oriented directly to the box containing the material to be investigated. For protection against aggregate recoil, the surface of the α-source was coated with a heavy-metal film. Recording was performed by NaI(Tl) crystal, УСД-1 (USD-1) attachment, УШ-2 (USh-2) wideband amplifier discriminator,

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Application of gamma quanta...

and ПС-10,000 (PS-10,000) scaler. On the basis of the intensity of 1.24-Mev gamma quanta calibration curves were plotted for the concentration of fluorite in feldspar. Al was not interfering with the determination. F may be also determined in beryl concentrates due to beryl emitting 3.43 - 4.45-Mev gamma quanta. It was found: $N_{CaF_2} = N_{1.24} - 0.51N_{3.4}$, where $N_{1.24}$ = intensity of counting of the 1.24-Mev gamma quanta; $N_{3.4}$ = intensity of counting of gamma quanta > 3.4 Mev. In addition, B_2O_3 was also determined by gamma ray spectroscopy in mixtures of ascharite and dolomite by discrimination of gamma quanta < 2 Mev. The relative error is 10-20% for 6% fluorite (or ascharite). The determination takes 30 min. For higher accuracy and reducing the time of analysis, the activity of the α-source must be raised to 0.5 c. In this case, the determination of 0.390 and 0.470-Mev gamma quanta of lithium should be possible. An advantage of the method is its selectivity and the small quantity of sample required (in the order of magnitude of tenths of a gram). The method is also applicable to the quantitative determination of B and F in solutions

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and molten material. There are 4 figures and 7 Soviet references.

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR (Mining Institute of the Academy of Sciences USSR)

SUBMITTED: July 21, 1961

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32322

S/020/61/141/005/017/018
B101/B144

21.4100

AUTHORS: Plaksin, I. N., Corresponding Member AS USSR, Belyakov, M. A., Malysheva, N. G., and Starchik, L. P.

TITLE: Use of (γ,n) nuclear reactions for determining beryllium in solutions and in the solid phase of suspensions

PERIODICAL: Akademiya nauk SSSR. Doklady, v.141, no. 5, 1961, 1158 - 1160

TEXT: The (γ,n) reaction shows high selectivity since Be has a very low excitation threshold (1.63 Mev). On irradiating samples containing Be with 1.63 - 2.2 Mev gamma quanta, neutrons are only knocked out of Be. The neutron quantity is proportional to the beryllium content. Basing on this fact, the authors developed their method of determining Be in flotation suspensions. Sb^{124} of 1-mcu activity was used as a gamma source placed in a paraffin block. 400-cm^3 bulbs containing solution or suspension were established into a cylindrical channel located in this block. The neutrons

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Use of (γ,n) nuclear reactions ...

moderated in paraffin were recorded by an CHMO-5 (SNMO-5) counter with an CY-3 (SCh-3) attachment for neutron counting. The calibration curve was plotted by means of aqueous $BeSO_4$ solutions. For low activity of Sb^{124} and 30-min counting time, the relative error of measurement was ±5%. Li has a disturbing effect due to its large capture cross section. Above 50% Li content, the number of neutrons counted decreases almost linearly with increasing Li content. The error caused by Li can be compensated by reducing the volume of the solution to be analyzed and by a higher activity of Sb^{124} used. For a high content of elements with large capture cross section, it is better to use the (α,n) reaction. In Be suspensions, sedimentation has to be prevented by an electrically driven impeller. Determination of Be was carried out in mixtures of $3BeO \cdot Al_2O_3 \cdot 6SiO_2$ (beryl) and $KALSi_3O_8$ (feldspar). The solid/liquid ratio has no effect. Because of the low Li content (8%), the effect of spodumene is within the error limits. The (γ,n) reaction permits a continuous determination of Be in flotation suspensions by passing the suspension through the paraffin block, and by

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Use of (γ,n) nuclear reactions ...

recording the neutrons counted. A study by B. S. Aydarkin et al. of 1940 (Tr. Radiyevogo inst. AN. SSSR, 5, no. 2 (1957)) is mentioned. There are 4 figures and 4 references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: A. M. Gaudin, J. H. Pannel, Anal. Chem., 23, 1261 (1951).

SUBMITTED: August 12, 1961

Card 3/3

PLAKSIN, I.N.; DEYEV, Yu.S.; STARCHIK, L.P.

Method for preparing polonium alpha emitters of low activity.
Atom. energ. 12 no.4:322-324 Ap '62. (MIRA 15:3)
(Alpha rays)
(Polonium)

S/089/62/013/004/007/011
B102/B108

AUTHORS: Plaksin, I. N., Belyakov, M. A., Starchik, L. P.

TITLE: Use of γ-spectroscopy for determining beryllium, boron, and fluorine in dressing products from the γ-radiation which attends nuclear interaction of these elements with α-radiation

PERIODICAL: Atomnaya energiya, v. 13, no. 4, 1962, 374 - 376

TEXT: As the selectivity of the neutron-spectroscopic determination of certain elements is insufficient it is suggested to use the γ-radiation which attends (α, n) and (α, p) reactions for analysis of elements. The γ-spectroscopic data required for analyzing Be, B, and F are presented and explained by several examples. (1) Be: The excited final nucleus produced in the reaction $Be^9(\alpha, n)C^{12}$ emits γ-quanta of 4.45 and 7.65 Mev which are characteristic of this reaction on Be^9. (2) F: In the reaction $F^{19}(\alpha, n)$ Na^{22} the final nucleus emits 0.62-Mev γ-quanta, and in the reaction F^{19} (α, p) Ne^{22} the Ne^{22} emits 1.24- and 1.5-Mev γ-quanta. (3) B: The reac-

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Use of γ-spectroscopy ...

tions $B^{10}(\alpha, n)N^{13}$ and $B^{11}(\alpha, n)N^{14}$ are accompanied by 2.3-Mev γ-radiation, and 3.8-Mev γ-quanta are emitted in the reaction $B^{10}(\alpha, p)C^{13}$. These quanta are always characteristic and make selective determination possible. The 4.45-, 2.3-, and 1.24-Mev peaks were used to analyze Be, B, and F, respectively. The α-source was a plane Po^{210} source of 2 - 5 millicuries. γ-recording was done using a УСА-1 (USA-1) scintillation element with an NaI(Tl) crystal and a broad-band УШ-2 (USh-2) discriminating amplifier with a ПС-100-0 (PS-10000) rate meter. The determination of Be was checked using a mixture of $Be_3Al_2 \cdot Si_6O_{18}$ and CaF_2. After correction for the γ-background the mean statistical error involved in determining beryllium oxide in various mixtures of beryllium oxide and fluorites was 15% with 30-min counting. The γ-counting rate in such samples was determined for 1.24 and > 3.4 Mev. The ratio C between these count rates opens a way to determine the fluorite content of samples which contain beryl by the formula $\beta CaF_2 = \beta BeO \cdot K$, where $K = [CaF_2]/[BeO]$. As $C = C_{Be} = 0.51$ for pure beryl, the γ-counting rate for α,F-reactions is given by $N_{CaF_2} = N_{1.24} - C_{Be} N_{3.4}$, where $N_{1.24}$ and $N_{3.4}$ denote the count rates for $E_\gamma = 1.24$ Mev and $E_\gamma > 3.4$

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Mev, respectively. Hence the fluorite content of the sample is given by $\eta = N_{CaF_2}\,\eta_{st}/\eta_{st}$, where η_{st} is the fluorite content of a standard. The method of count-rate ratios can also be used for analyzing samples which have more than two components, as is shown here by the determination of BeO, B_2O_3, and CaF_2 in a sample containing ascharite. The boron content is determined from $N_{B_2O_3} = N_{2.2} - C'_{Be} N_{3.4}$, where $C'_{Be} = N_{2.2}/N_{3.4}$ for pure beryl. Fluorite is determined from $N_{CaF_2} = N_{1.2} - C_B N_{2.2} + KN_{3.4}$, where $K = C'_{Be} C_B - C''_{Be}$. $C''_{Be} = N_{1.2}/N_{3.4}$ for pure beryl and, $C_B = N_{1.2}/N_{2.2}$ for pure ascharite. There are 4 figures.

SUBMITTED: March 9, 1962

Card 3/3

STARCHIK, L.P.

Charges picked up by particles during separation in electric drum separators. Nauch. soob. IGD 16:161-168 '62. (MIRA 16:8)
(Separators (Machines)) (Particles--Electric properties)

PLAKSIN, I.N.; BELYAKOV, M.A.; STARCHIK, L.P.

Use of nuclear reaction (γ,nγ') for the determination of beryllium in concentration products. Dokl. AN SSSR 142 no.2:374-376 Ja '62. (MIRA 15:2)

1. Institut gornogo dela im. A.A.Skochinskogo AN SSSR.
2. Chlen-korrespondent AN SSSR (for Plaksin).
(Beryllium--Analysis)
(Nuclear reactions)

PLA[redacted]IN, I.N.; BELYAKOV, M.A.; STARCHIK, L.P.

Measuring the thickness of foils and films with the aid of the $(\alpha, n\gamma)$ nuclear reaction. Prib. i tekh. eksp. 8 no.5:210-211 S-O '63. (MIRA 16:12)

MALYSHEVA, N.G.; STARCHIK, L.P.; PANIDI, I.S.; PAUSHKIN, Ya.M.

Application of the method of neutron absorptiometry for determining the boron content of organoboron compounds. Zhur. anal. khim. 18 no.11:1367-1369 N '63. (MIRA 17:1)

1. Institut neftekhmicheskoy i gazovoy promyshlennosti imeni I.M. Gubkina, Moskva.

L 12836-63 EWT(m)/BDS AFFTC/ASD

52

ACCESSION NR: AP3003223 S/0020/63/150/006/1270/1273

AUTHOR: Plakein, I. N. (Corr. member, AN, SSSR); Belyakov, M. A., Starchik, L.P

TITLE: On the possibility of selective determination of certain light elements by measurement of the yield of nuclear reactions (Alpha, nGamma) and (Alpha, pGamma)

19

SOURCE: AN SSSR. Doklady*, v. 150, no. 6, 1963, 1270-1273

TOPIC TAGS: nuclear reaction, radioactive determination, light element, polonium, Alpha-particle

ABSTRACT: The probability for the penetration of the potential barrier of the nucleus by alpha particles increases greatly with the energy of the latter. The potential barrier increases with the atomic number. The authors utilized the low barrier and the high yield of the light elements for their quantitative determination in the pressure of heavier elements. Polonium^{210} was the source of alpha particles, which were filtered by thin layers of metals. The energy of filtered particles was in the 3 to 4 Mev range, suitable for the selective reactions derived. For instance, for determination of Be in presence of F, two

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ACCESSION NR: AP3003223

determinations - one with, another without filter are needed. Two equations for the yields from both elements are set up, the solution of which gives the quantity of Be present in the specimen. The filters must be calibrated with known concentrations. Orig. art. has: 3 figures and 4 equations.

ASSOCIATION: none

SUBMITTED: 16Jan63 DATE ACQ: 24Jul63 ENCL: 00

SUB CODE: PH, EL NO REF SOV: 006 OTHER: 002

Card 2/2

ACCESSION NR: AP4041149 S/0020/64/156/004/0803/0805

AUTHOR: Plaksin, I. N.; Maly*sheva, N. G.; Starchik, L. P.

TITLE: Application of bremsstrahlung of beta emitters for excitation of photonuclear reactions

SOURCE: AN SSSR. Doklady*, v. 156, no. 4, 1964, 803-805

TOPIC TAGS: gamma bremsstrahlung, artificial beta emitter, gamma irradiation, beryllium irradiation, deuterium irradiation, gamma neutron reaction, photonuclear reaction

ABSTRACT: The reaction of gamma photons (γ, n) is used for the determination of Be in ores and of D in water. Their energy must be greater than 1.63 and 2.23 Mev for Be and D, respectively. The natural gamma emitters are expensive, and the artificial ones too short lived. Therefore the authors used the artificial beta emitter Sr^{90} ($T_{1/2}$ = 28.4 yrs), in equilibrium with the daughter product Y^{90} ($T_{1/2}$ = 64.8 hs) which emit beta particles with E_{max} = 2.27 Mev, and some other beta emitters. The source of 500 mcurie was surrounded by a lead shell which served for the production of gamma photons and at the same time shielded the

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ACCESSION NR: AP4041149

counter from beta particles. The calibration curves were prepared by comparison of the neutron yield of concentrated heavy water and was in a range >10%. The neutron counter CHMO-5 contained enriched B^{10}. For smaller concentrations stronger sources are needed. Orig. art. has: 2 figures.

ASSOCIATION: Institut gornogo dela im. A. A. Skochinskogo (Mining Institute)

SUBMITTED: 06Jan64 ENCL: 00

SUB CODE: NP NO REF SOV: 002 OTHER: 004

Card 2/2

PLAKSIN, I.N.; MALYSHEVA, N.G.; STARCHIK, L.P.

Use of the neutron absorption method in determining mercury in enriched products. Zav. lab. 30 no.7:824-825 '64. (MIRA 18:3)

1. Institut gornogo dela imeni Skochinskogo.

PLAKSIN, I.N.; DZHEMARD'YAN, Yu.A.; MALYSHEVA, N.G.; STARCHIK, L.P.

Study of factors affecting the nuclear reaction method of determining lithium and boron in products of ore dressing. TSvet. met. 38 no.6:18-22 Je '65. (MIRA 18:10)

PLAKSIN, I.N., [illegible]; PUSTYNNIKOV, V.S.

Determination of praseodymium and neodymium by means of the (n, 2n) reaction. Dokl. AN SSSR 165 no.5:1095-1096 (MIR 19:1)
T '65.

1. Institut gornogo dela im. A.A.Skochinskogo. 2. Chlen-korrespondent AN SSSR (for Plaksin). Submitted June 24, 1965.

S/137/61/000/010/055/056
A006/A101

AUTHORS: Plaksin, I.N., Smirnov, V.N., Starshik, M.P.

TITLE: The use of Po^{210} alpha radiation for the quantitative control of concentration products containing beryllium, boron, fluorine and aluminum

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 10, 1961, 8, abstract 10K45 ("Tr. Tashkents, konferentsii po mirn. ispol'zovaniyu atomn. energii v. 2", Tashkent, AN AzSSR, 1960, 193 - 299)

TEXT: The authors discuss 2 methods of analysis with the aid of Po^{210} α - radiation, namely, analysis using radiation emitted as a result of the reaction of capturing nuclear particles by reaction (α, n) and activation analysis. To determine Be, B, F in concentration products, the following nuclear reactions are employed: $Be^{8}_{4} + He^{4}_{2} \rightarrow C^{12}_{6} + n'_{0}$; $F^{19}_{9} + He^{4}_{2} \rightarrow Na^{22}_{11} + n'_{0}$ and $B^{11}_{5} + He^{4}_{2} \rightarrow N^{14}_{7} + n'_{0}$. The amount of n is proportional to the Be, F and B content. To carry out an analysis of powdery products a special device was developed. A detailed layout of the device is presented. The Be, B and F content is determined from graduation graphs or by a corresponding calculation formula. The radio-

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S/137/61/000/010/055/056
A006/A101

The use of Po^{210} alpha radiation ...

activation analysis was employed for the quantitative control of products containing Al and B. Po^{210} with 120 mcurie activity was employed as a radiation source. The radioactivity induced was measured with an end-window counter of device B. The content is calculated from graduation graphs, plotted for standard mixtures. The separate determination of B and Al is obtained on account of the difference in their maximum radiation energies and the half life periods. The accuracy of determination is 2 - 3%. There are 9 references.

Yu. Bykovskaya

[Abstracter's note: Complete translation]

Card 2/2

STARCHIKOV, A.V.

Durability of wall blocks made of natural limestone.
Standartizatsiia 27 no.1:31-33 Ja '63. (MIRA 17:4)

SOV-118-58-8-19/24

AUTHOR: Starchikov, A.V., Engineer

TITLE: Mechanization of the Work Done in the Block Rubble Quarry of the Kamysh-Burun Plant of Building Materials (Mekhanizatsiya rabot na kar'yere shtuchnogo kamnya Kamyshburunskogo zavoda stenovykh materialov)

PERIODICAL: Mekhanizatsiya trudoyëmkikh i tyazhëlykh rabot, 1958, Nr 8, pp 39-40 (USSR)

ABSTRACT: Two stone cutting machines, KM-5 and KM-6, are used in the Kamysh-Burun shell rock quarry from which stones of standard dimensions are cut. The KM-6 machine is an improvement over the KM-5 machine. Cutting is accomplished with disc saws, the teeth of which are made of specially hardened VK-8 alloy. These discs make one perpendicular cut, one along the extension of the ditch, and a rear cut, after which the machine returns to its initial position while the cut stones are taken away. Two diagrams further explain this machine.
There are 2 diagrams.

1. Quarries--USSR 2. Machines--Performance

Card 1/1

STARCHIKOV, A.

Using shell rock bricks in laying hollow walls. Sel'.stroi. 13 no.11:22 N '58. (MIRA 11:12)

1. Zaveduyushchiy laboratoriyey nerudnykh materialov Krymskogo filiala nauchno-issledovatel'skogo instituta stroitel'nykh materialov.

(Walls) (Hollow bricks)

STARCHIKOV, A.V., inzh.; MESHMAN, A.N., inzh.

The SM-518 machine for working high-strength sawed limestone deposits. Stroi.mat. 5 no.8:30-31 Ag '59. (MIRA 12:12)
(Quarries and quarrying--Equipment and supplies)
(Limestone)

KABANOV, V., inzh.; MAKAROV, A., svarshchik; STARCHIKOV, A., gornyy inzh. (Simferopol')

To the efficiency promotion fund of the seven-year plan. Izobr. i rats. no.8:26-27 Ag '59. (MIRA 13:1)

1.Zavod "Santekhdetal'," Ryshkany, Moldavskoy SSR (for Makarov).
(Efficiency, Industrial)

STARCHIKOV, A., inzh.; LEYKIN, M., inzh.

Quarry serving several collective farms. Sel'. stroi. 13 no.4:18 Ap '59. (MIRA 12:6)
(Crimea--Quarries and quarrying)

STARCHIKOV, A.V., inzh.; SULYAYEV, P.Ye., inzh.

Putting an end to accidents in the Livenskii Quarry. Bezop. truda v prom. 4 no.3:29-30 '60. (MIRA 13:6)
(Quarries and quarrying--Safety measures)

STARCHIKOV, A.V., inzh.

New stone remover. Stroi. i dor. mashinostr. 5 no.10:28 O '60.
(MIRA 13:10)

(Quarries and quarrying--Equipment and supplies)

LAZARENKO, N., master; STARCHIKOV, A., inzh.

Brief news. Stroitel' no.6:31 Je '60. (MIRA 13:7)
(Construction industry)

STARCHIKOV, A.V., inzh.; MAKAROV, V.L., inzh.

Stone-handling machine designed by Krivorutchenko. Stroi. mat. 6 no.12:23-24 D '60. (MIRA 13:11)
(Quarries and quarrying--Equipment and supplies)

MESHMAN, A.N., inzh.; STARCHIKOV, A.V., inzh.

The new KM-4 high-stepped stonecutting machine. Mekh.i avtom. proizv. 14 no.1:51 Ja '60. (MIRA 13:5)
(Stonecutting--Equipment and supplies)

KOVLER, B.; STARCHIKOV, A., inzh.

Information. Sel'. stroi. 15 no.12:29 D '60. (MIRA 13:12)

1. Glavnyy spetsialist otdela sel'skogo stroitel'stva Gosstroya RSFSR.

(Building)

STARCHIKOV, A.V., inzh.

New SM-543 benching machine. Mekh. stroi. 17 no.6:25-26 Je '60. (MIRA 13:6)
(Quarries and quarrying--Equipment and supplies)

STARCHIKOV, A., inzh.

Using limestone blocks. Sel'. stroi. no.10:20 O '62. (MIRA 15:11)

(Crimea—Limestone)
(Building stones)

STARCHIKOV, A.V. (Simferopol')

Using large blocks of sawed limestone in the construction of foundations. Osn., fund.i mekh.grun. 4 no.4:13 '62. (MIRA 15:8)

(Crimea--Foundations) (Limestone)

MAKAROV, V.L., inzh.; STARCHIKOV, A.V., inzh.

Mechanization of loading and unloading operations in the extraction of wall blocks. Mekh.stroi. 19 no.12:10-11 D '62. (MIRA 15:12)

(Loading and unloading) (Crimea--Building stones)